

B.Tech 4th Semester Mid-Term Examination, 2018

Structural Analysis-II

Subject Code: 011X06

Time: 2 hours

Full Marks: 20

Instructions:

- (i) Attempt any four questions.**
- (ii) Question No. 1 is compulsory.**

1. Chose the correct option of the following (any five)

(a) Degree of kinematic indeterminacy of pin jointed plane frame is given by:

- (i) $2j-r$
- (ii) $r-2j$
- (iii) $3j-r$
- (iv) $r-3j$

(b) Bending moment at any section in conjugate beam gives in the actual beam

- (i) Slope
- (ii) Deflection
- (iii) Curvature
- (iv) Bending moment

(c) Which of the following is a force method?

- (i) Slope deflection
- (ii) Moment distribution
- (iii) Column analogy method
- (iv) None of these

(d) Degree of kinematic indeterminacy of rigid jointed plane frame is given by

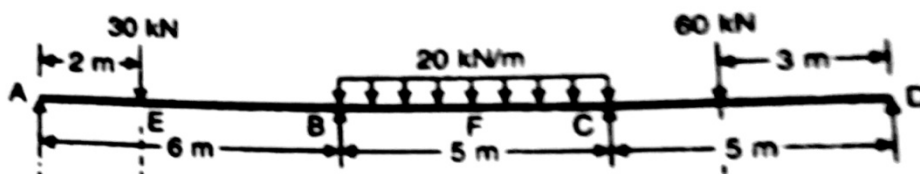
- (i) $2j-r$
- (ii) $r-2j$
- (iii) $3j-r$
- (iv) $r-3j$

(e) Degree of static indeterminacy of rigid jointed plane frame is given by

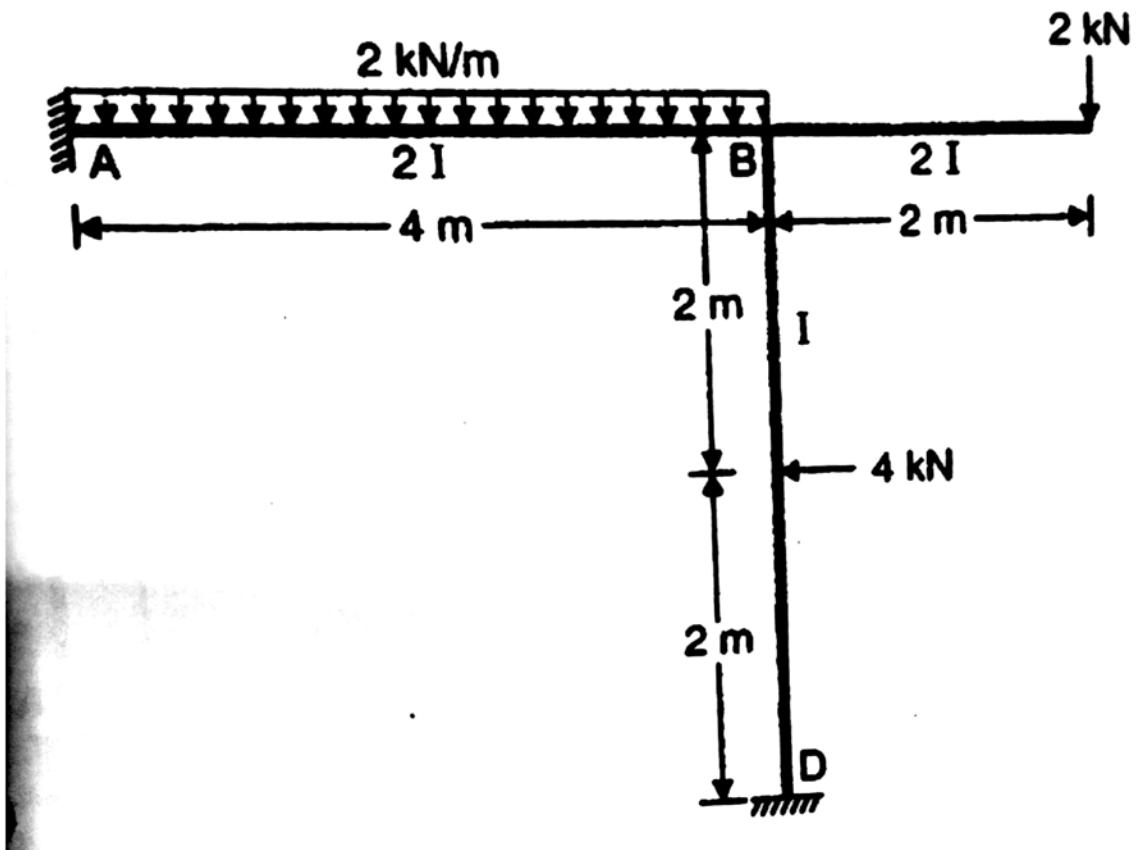
- (i) $3m+r-3j$
- (ii) $m+r-2j$
- (iii) $6m+r-6j$

- (iv) None of these
- (f) Principle of superposition is applicable when
- (i) Deflections are linear functions of applied forces
 - (ii) Material obeys Hooke's Law
 - (iii) Action of applied forces will be affected by small deformations of the structure
 - (iv) None of these
- (g) The Castigliano second theorem can be used to compute deflections
- (i) At the point under the load only
 - (ii) For beams and frames only
 - (iii) For any type of structures
 - (iv) For statically determinate structures only

2. A beam of total length $2l$ is simply supported on three supports. Two supports are at the end and one at the middle of the beam. Whereas the moment of inertia of the right span of the beam is I , that of the left span is $2I$. The right span carries a point load uniformly distributed load at the rate of W per unit length. Calculate the reactions at all supports.
3. A propped cantilever of span l is carrying u.d.l. at the rate W /unit length over entire length l from the fixed end. Determine the reactions. Use conjugate beam method.
4. Analyze the following continuous beam shown in figure using three moment theorem. Assume E and I to be same.



5. A parabolic arch hinged at the ends has a span of 60 m and a rise of 12 m. A concentrated load of 8kN acts at 15m from the left hinge. The second moment of area varies as the secant of the inclination of the arch axis. Calculate the horizontal thrust and the reactions at the hinge. Also calculate the net bending moment at the section.
6. Analyze the following structure shown in Figure.



BEST OF LUCK